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Renewable Energy Transmission Initiative Phase 1B Activities

Black & Veatch

Stakeholder Steering Committee

May 21, 2008

Discussion

- Phase 1B Modeling Workgroup
- Consideration of Uncertainties
- Energy Price Forecast

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Phase 1B Modeling Workgroup

Phase 1B Modeling Workgroup

- Constitute workgroup similar to Phase 1A Work Group
  - Advise Black & Veatch on significant methodology and assumptions, *such as*:
    - Reviewing resource valuation model
    - Developing energy price scenario assumptions
    - Developing sensitivity assumptions for uncertainty analysis
    - Determine criteria for advancing CREZs to Phase 2

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Economic Uncertainty Proposal

RETI Uncertainty Team

Reminder of Objective for Phase 1

- Identify most promising CREZs for further evaluation in Phase 2

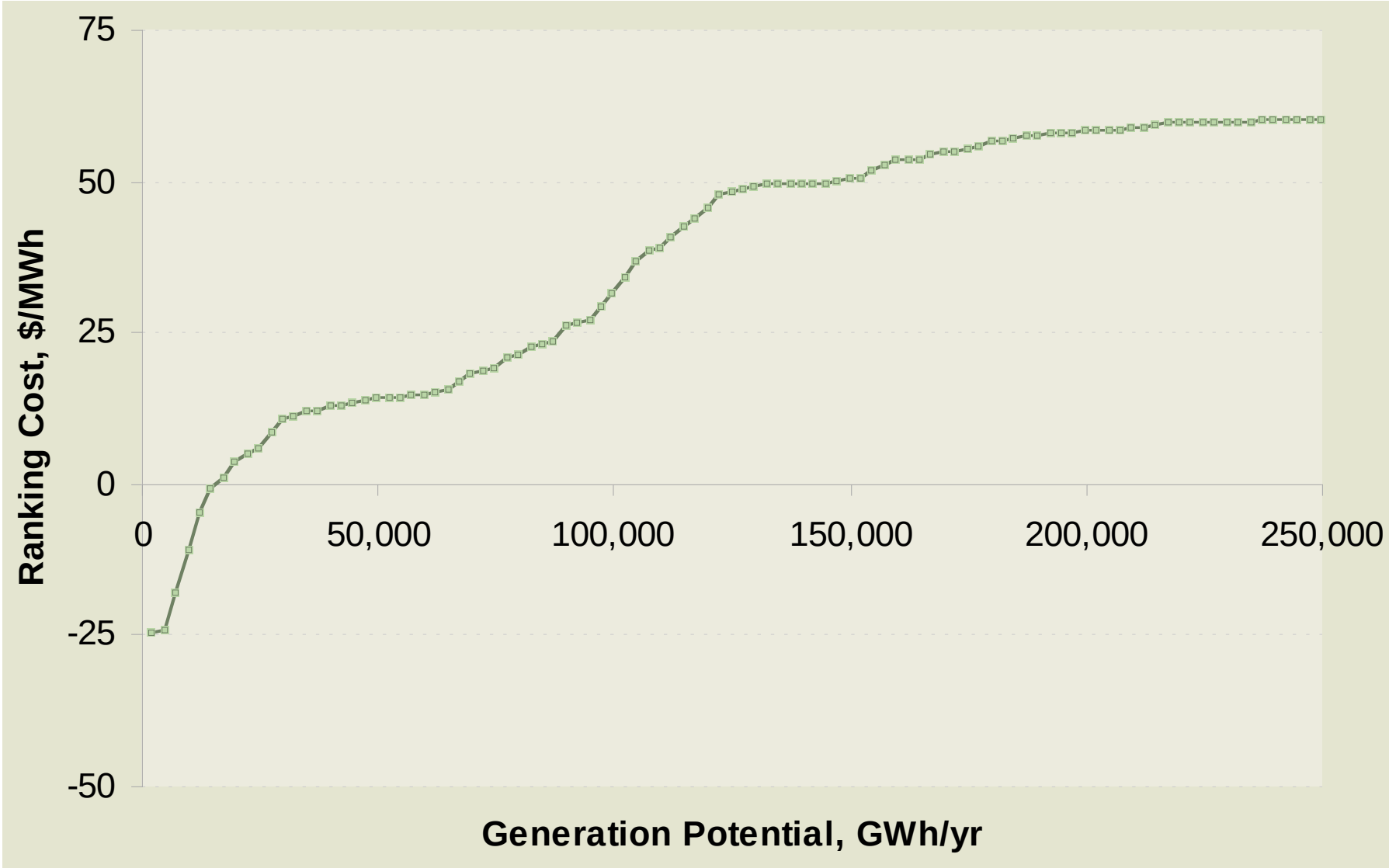
Establish Uncertainty Band for Each Technology for a Representative Project

Variability areas: capital cost, capacity factor

- Wind $/MWh (+/-28%)
- Biomass $/MWh (+/-18%)
- Geothermal $/MWh (+/-22%)
- Solar Thermal $/MWh (+/-23%)
- Solar PV $/MWh (+/- 9%)

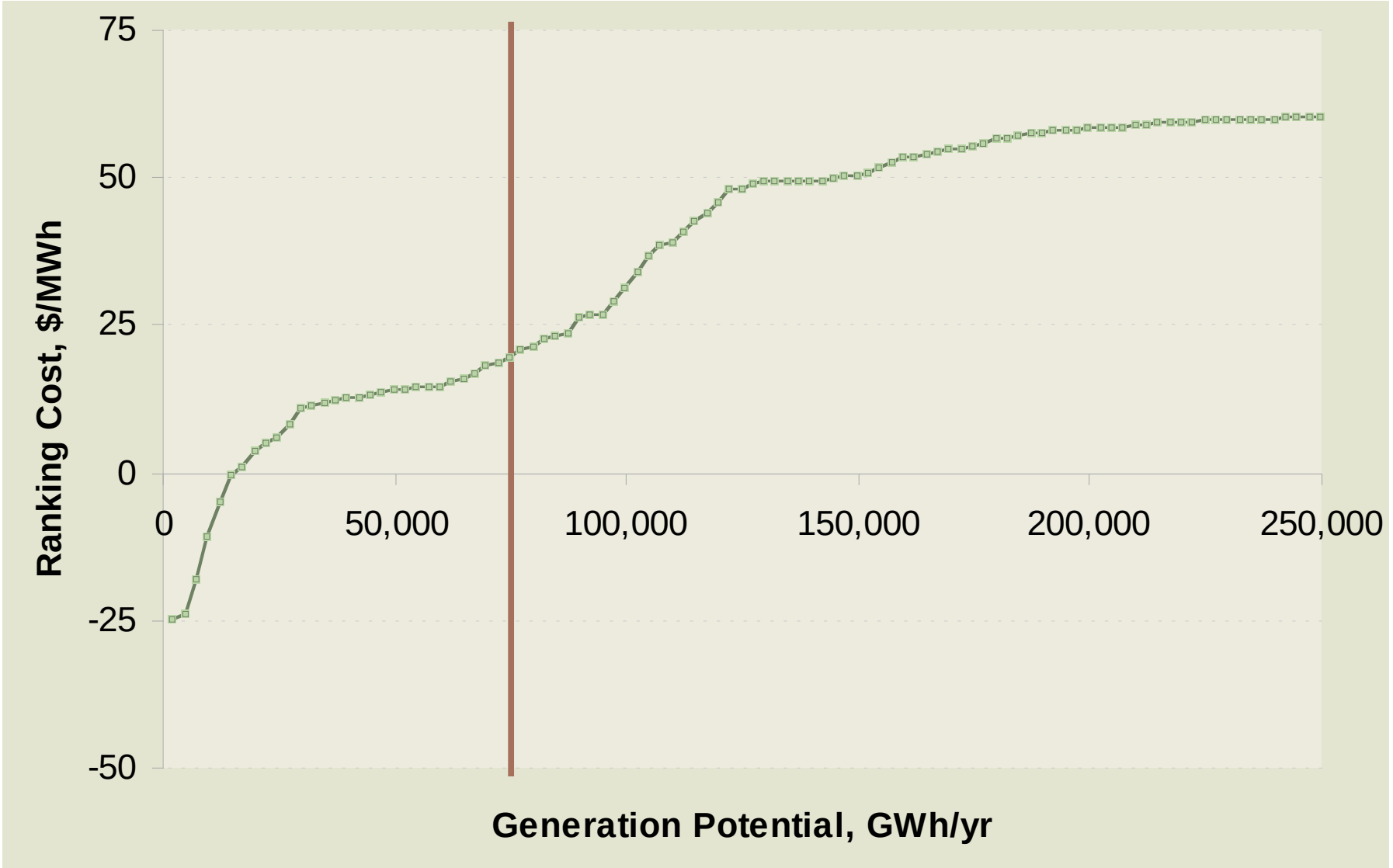
Conceptual – For Example Only

CREZ Supply Curve (no uncertainty)



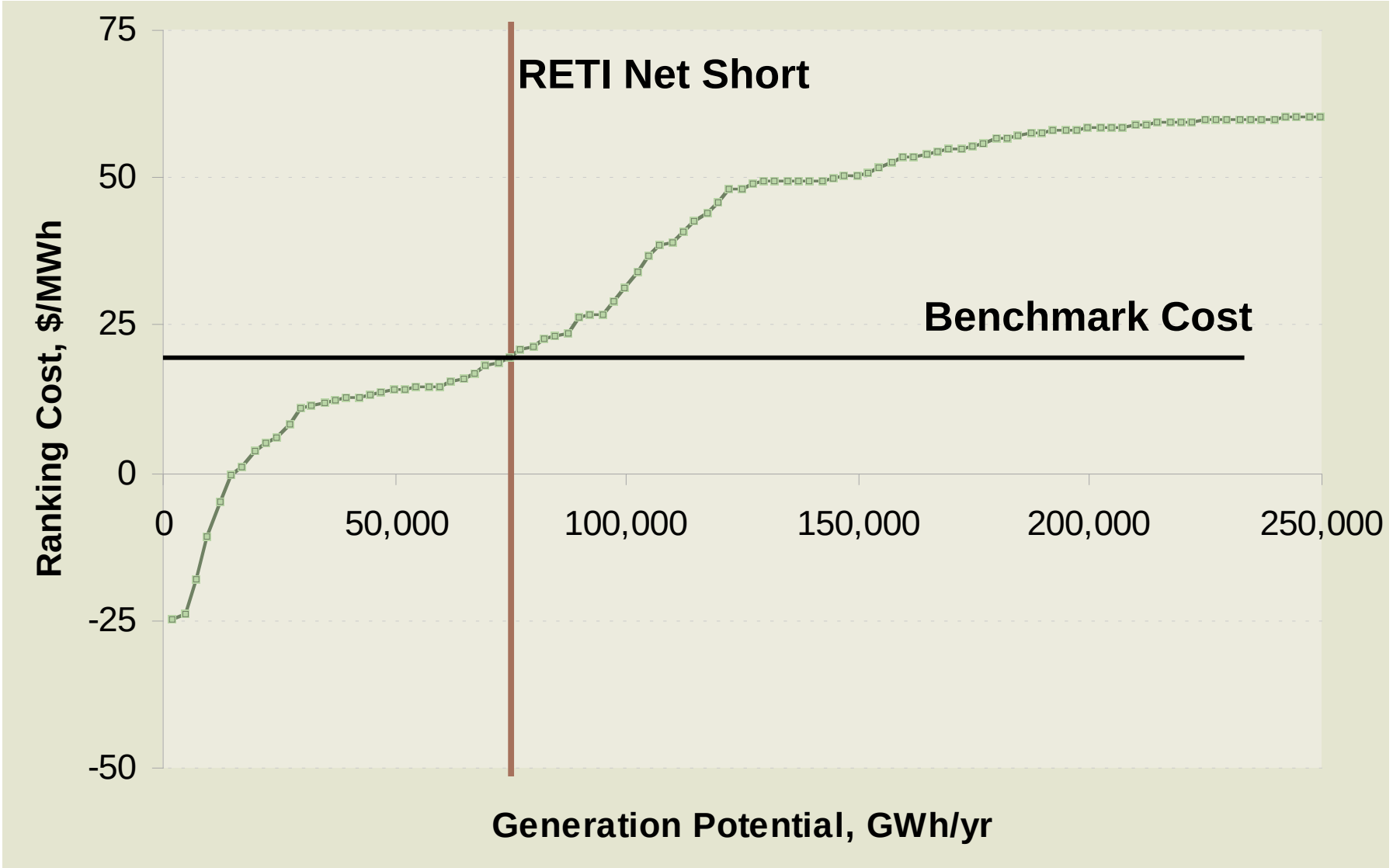
Conceptual – For Example Only

RETI Net Short



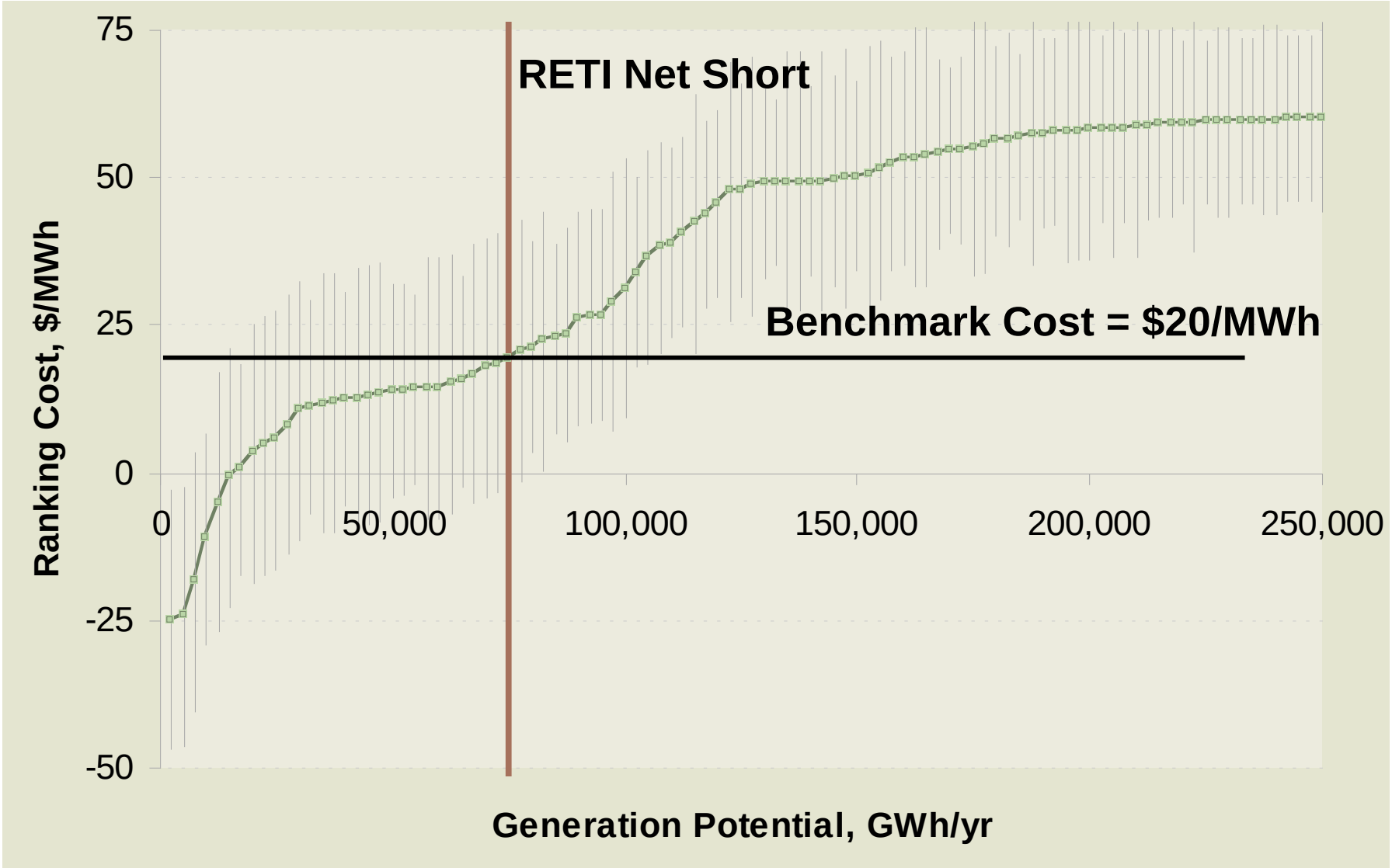
Conceptual – For Example Only

Benchmark Cost



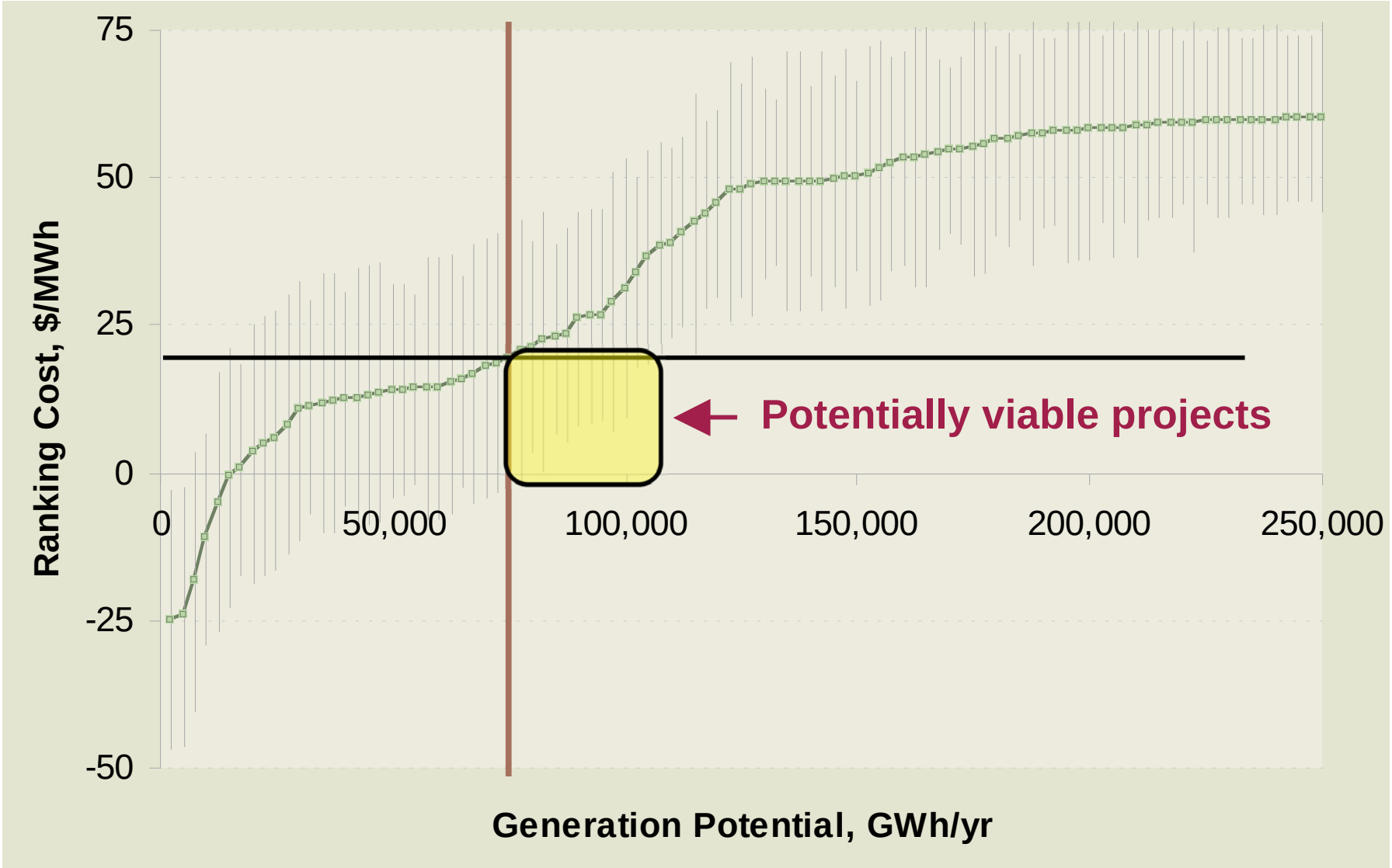
Conceptual – For Example Only

Uncertainty



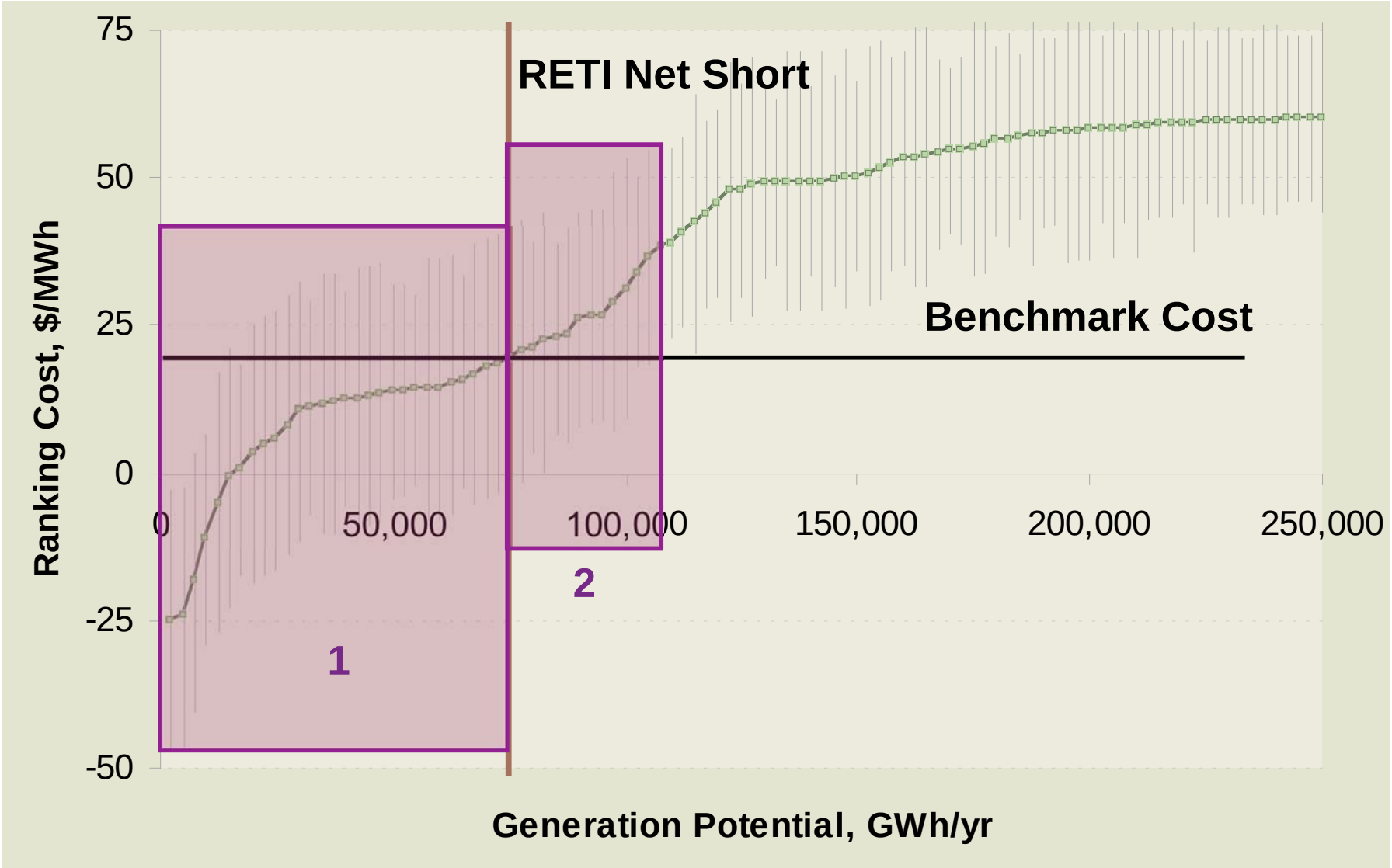
Conceptual – For Example Only

Uncertainty



Conceptual – For Example Only

Tiers



Conceptual – For Example Only

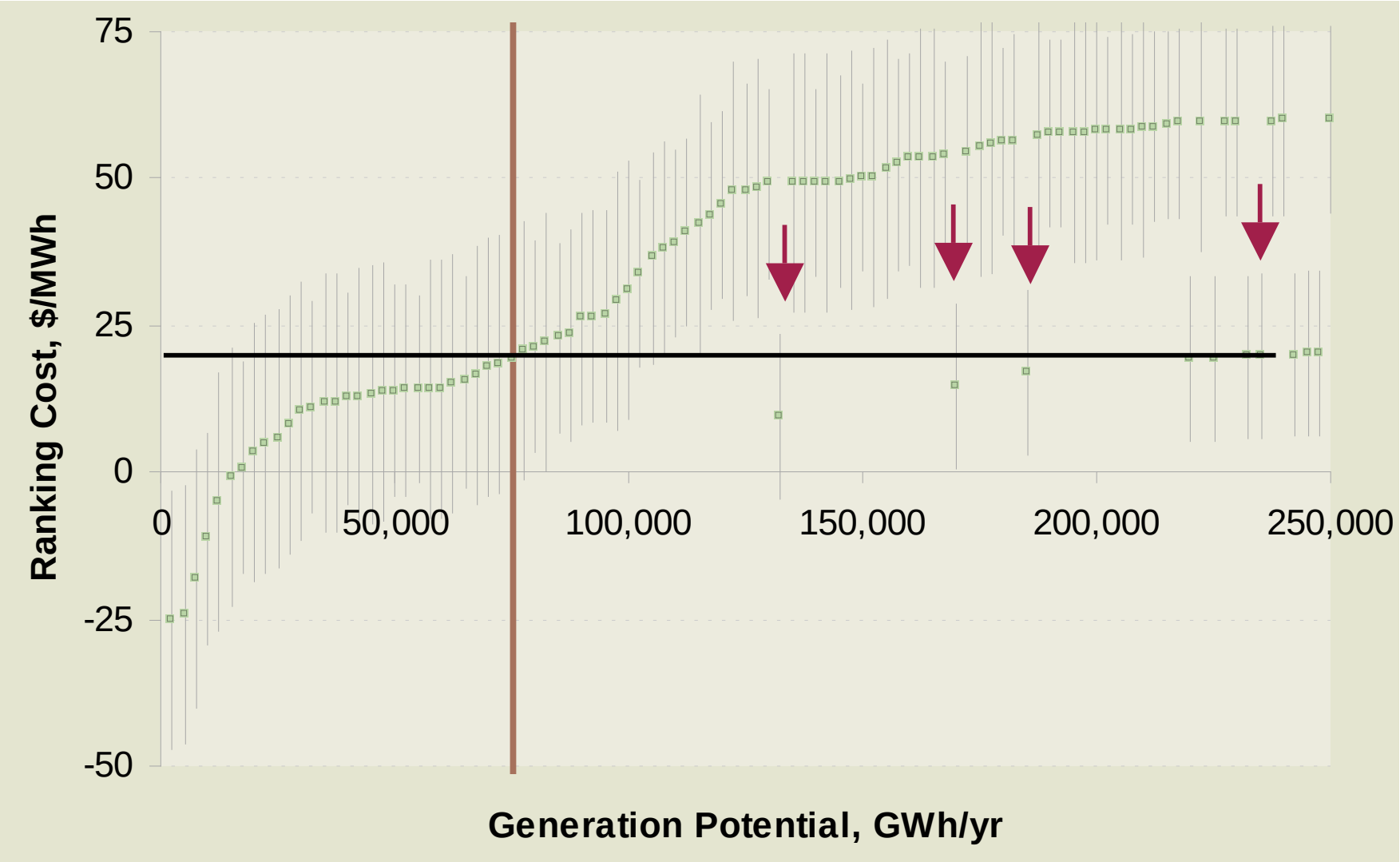
Tiers - CREZs will be ranked into broad Tiers

Tier	Ranking Cost Compared to Benchmark Cost (BC)	Implication
1	Low < BC Mean < BC High < or > BC	Likely to be competitive
2	Low < BC Mean > BC High > BC	Could be competitive
3	Sensitivities	Competitive under certain scenarios (see next slides)

Sensitivity Scenarios

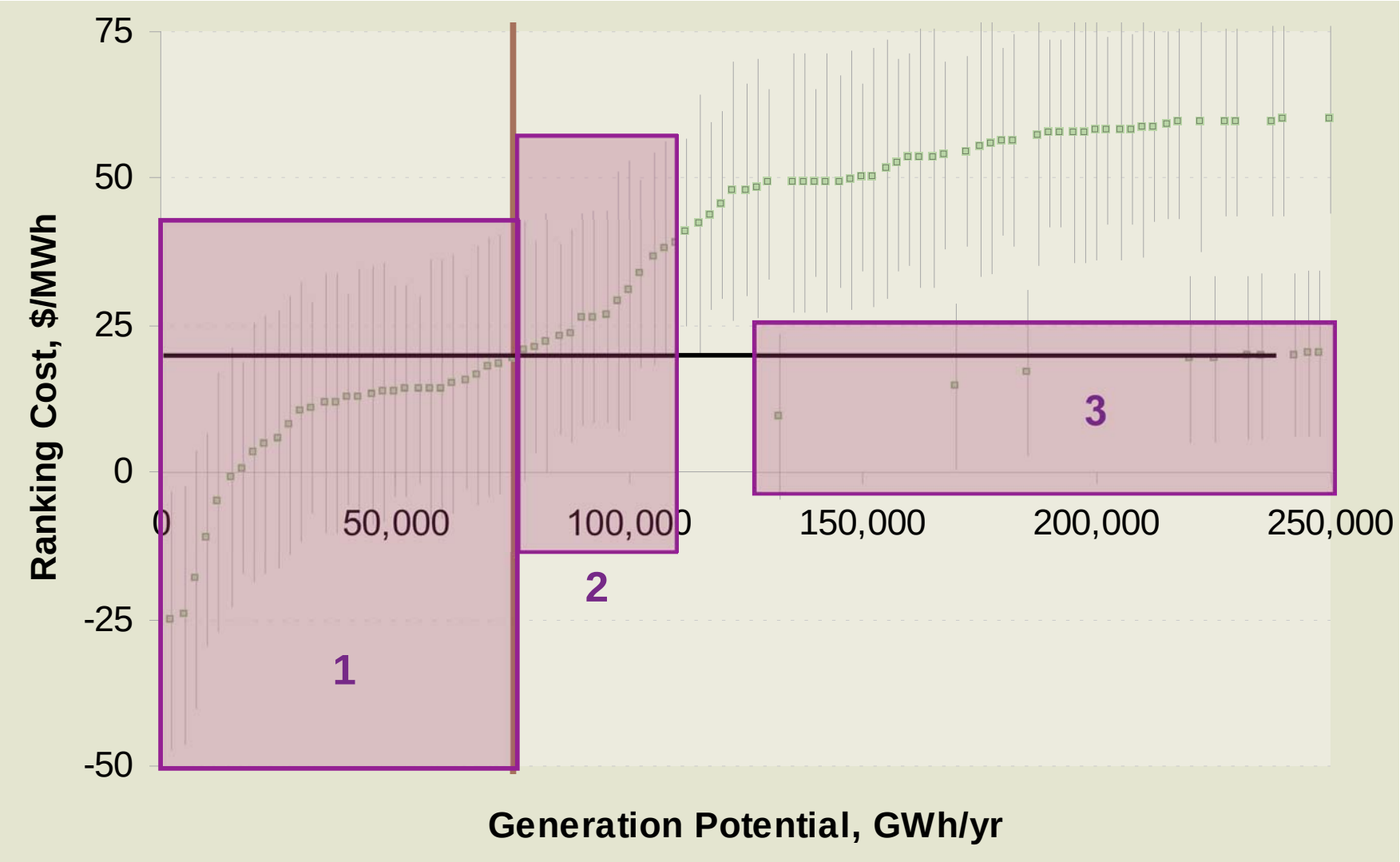
- Tax Credits
- Transmission Costs
- Energy Value
- Lower Capacity Value
- Lower Solar PV Costs
- Development timeframe (selected areas only)

Example Sensitivity Scenario

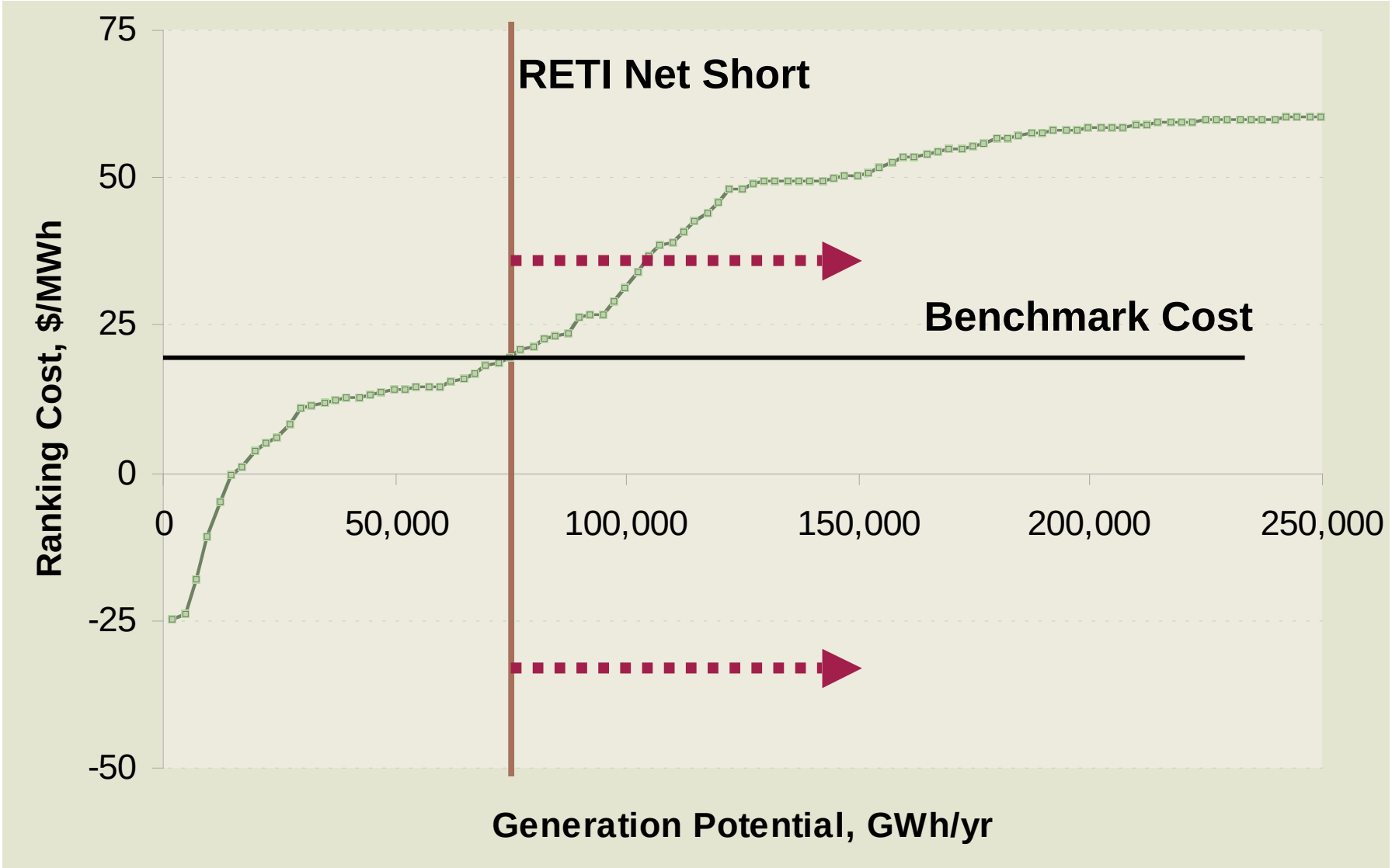


Conceptual – For Example Only

Sensitivity Scenario – new Tier 3



Advance Extra Zones for Competition / Resource Uncertainty / Future??



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Energy Price Forecast Proposal

Energy Value – Price Forecast

- Required to determine value of resources

Ranking Cost = Costs - Value

Costs
Generation Cost + Transmission Cost + Integration Cost

Value
Energy Value + Capacity Value

Energy Value

Energy value = (resource generation) x (zonal, T.O.D. market price),
where:

- Marginal cost price – hourly forecast (2010-2020) developed by production cost modeling
- Zonal prices – energy priced in zone where resource is located (15 zones):
  - 8 in California, 7 outside California
- TOD factors – based on WECC trade periods
  - Super-peak
  - On-peak
  - Off-peak

Price Zones

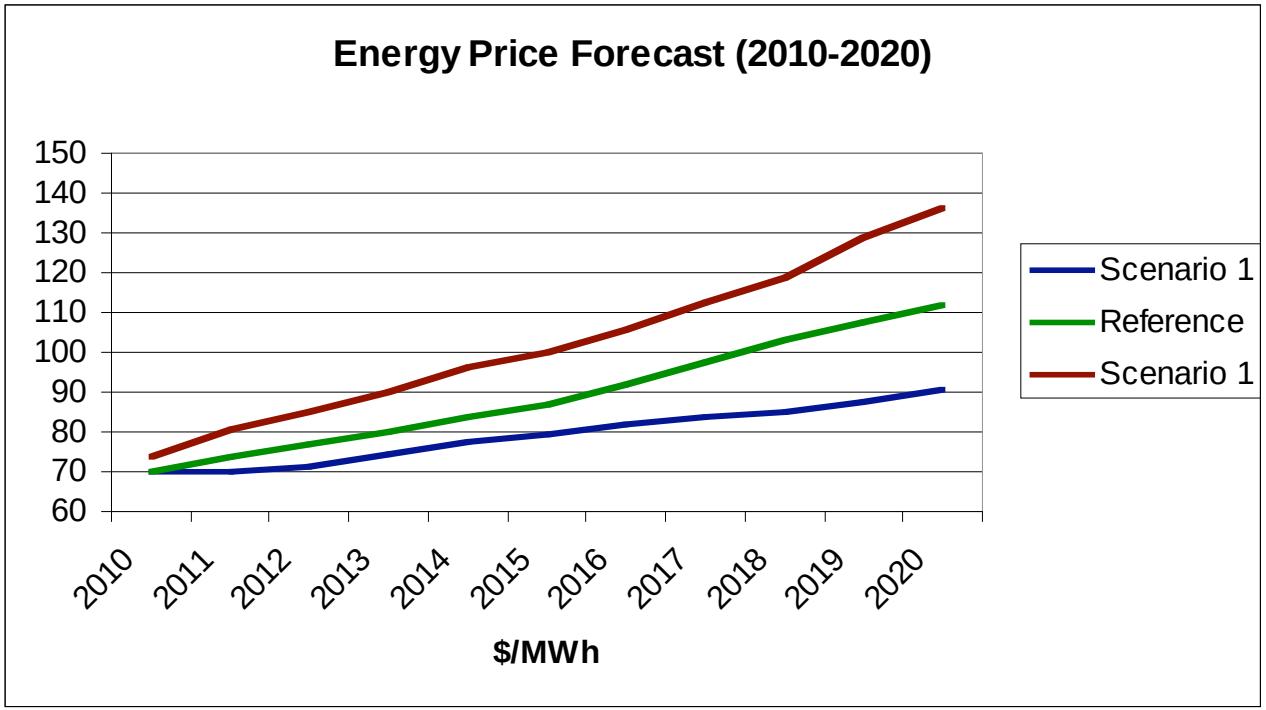
N. California (NP15)	Imperial I.D.	N. Nevada
C. California (ZP26)	Imperial V. - NG	S.Nevada
SCE	CA/OR Border (COB)	Palo Verde
LADWP	Pacific Northwest	Arizona
SDG&E	British Columbia	N. Baha (Mex.)

Energy Value

- Three forecasts to be developed by Ventyx
  - Reference case forecast
    - Assumptions consistent with CEC 2007 IEPR “1B” scenario
  - Two alternative price forecasts for use in uncertainty analysis
    - Goal to reflect plausible range of market scenarios
    - Assumptions to be developed by Modeling Workgroup

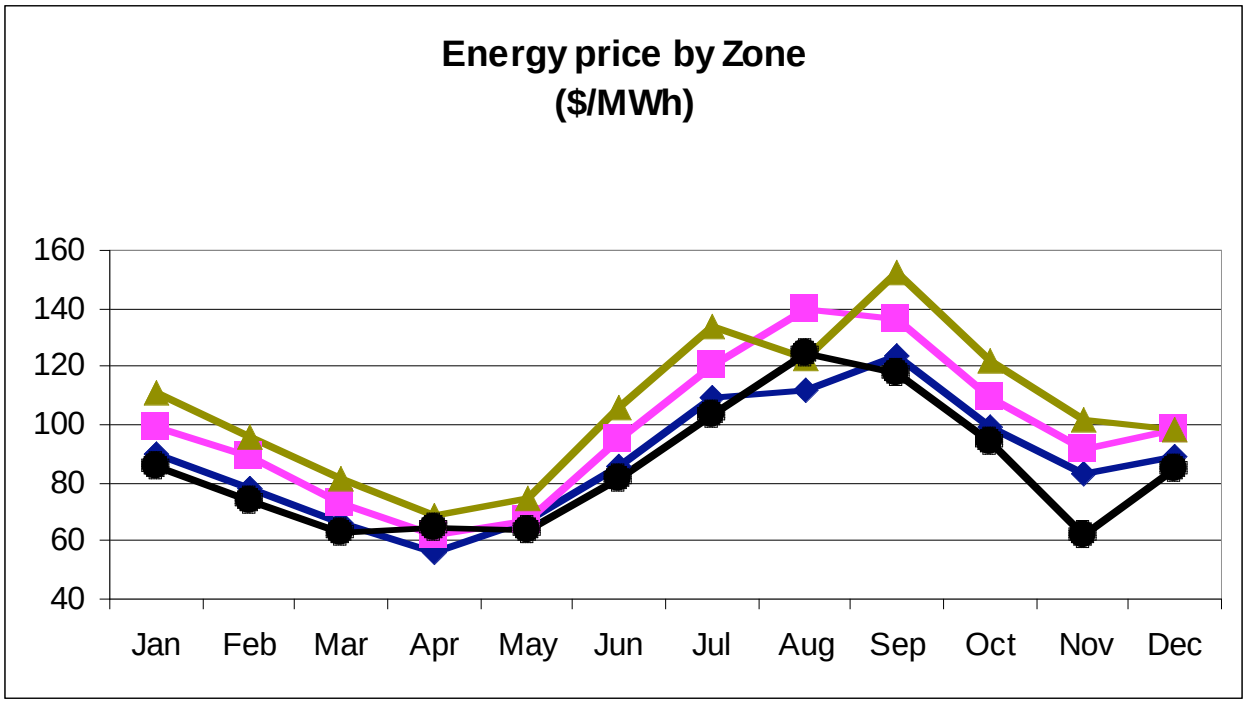
Energy Value

- Reference scenario to reflect CEC IEPR Scenario 1B assumptions
- Alternative scenarios for uncertainty analysis – reflect range of potential market prices



Energy Value

- Energy price forecast would be zone specific – resources priced in zone where energy is generated



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Thank You!

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